

**Assessment Schedule – 2010****Statistics and Modelling: Use probability distribution models to solve straightforward problems (90646)****Evidence Statement**

Q	Evidence	Code	Judgement	Sufficiency
			For all questions accept any rounding of at least 2sf except 2c.	
ONE (a)	Normal distribution ( $\mu = 19.3, \sigma = 1.34$ ):  $P(X > 18) = 0.83401$ $= 83.4\%$	a	Accept equivalent decimal or fraction.	<b>A:</b> 1a or 1b <b>2A:</b> 1a and 1b <b>M:</b> appropriate part from 1c <b>E:</b> Achievement + 1c
(b)	Binomial distribution ( $n = 10, p = 0.05$ ):  $P(X \geq 3) = 0.01151$	a	Accept equivalent percentage or fraction.	
(c)	Let $Q = \text{Pick} - \text{Pack}$ Then $Q \sim \text{Normal}$ $\mu_q = -10.3$ $\sigma_q = \sqrt{37.7} = 6.14$  Require $P(\text{Pick} > \text{Pack})$ I.e $Q > 0$  $P(Q > 0) = 0.046721$	m	Correct mean and standard deviation.	
		e	Accept equivalent percentage or fraction with evidence of appropriate workings.	
TWO (a)	Poisson distribution $\lambda = 0.4$ $P(X < 2) = 0.93844$	a	Accept equivalent percentage or fraction.	<b>A :</b> 2a <b>M:</b> 2b <b>E:</b> Merit + 2c
(b)	From table $\lambda = \frac{60}{5} = 12$ So for every five metre section, Poisson distribution with $\lambda = 6$  $P(X > 4) = 1 - P(X \leq 4)$ $= 1 - 0.28505$ $= 0.71495$	m	Accept equivalent percentage or fraction.	
(c)	$P(X = 0) + 0.35 + 0.2 = 1$ $P(X = 0) = 0.45$  $e^{-\lambda} = 0.45$ $\lambda = 0.7985$ $= 0.8$ (1 dp)	a  e/m		

**Judgement Statement**

Achievement	Achievement with Merit	Achievement with Excellence
Use probability distribution models to solve straightforward problems.	Use probability distribution models to solve problems.	Use and justify probability distribution models to solve complex problems.
2 <b>A</b> OR 1 <b>2A</b>	2 <b>M</b> OR 1 <b>M</b> + 1 <b>2A</b> OR 1 <b>E</b> + 1 <b>A</b>	1 <b>E</b> + 1 <b>M</b>

The following Mathematics-specific marking conventions may also have been used when marking this paper:

- Errors are circled.
- Omissions are indicated by a caret (^).
- **NS** may have been used when there was not sufficient evidence to award a grade.
- **CON** may have been used to indicate 'consistency' where an answer is obtained using a prior, but incorrect answer and **NC** if the answer is not consistent with wrong working.
- **CAO** is used when the 'correct answer only' is given and the assessment schedule indicates that more evidence was required.
- **#** may have been used when a correct answer is obtained but then further (unnecessary) working results in an incorrect final answer being offered.
- **RAWW** indicates 'right answer, wrong working'.
- **R** for 'rounding error' and **PR** for 'premature rounding' resulting in a significant round-off error in the answer (if the question required evidence for rounding).
- **U** for incorrect or omitted units (if the question required evidence for units).
- **MEI** may have been used to indicate where a minor error has been made and ignored.